

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-289158

(43)Date of publication of application : 17.10.2000

(51)Int.Cl.

B32B 27/32  
B32B 27/00  
B65D 65/40  
C08L 23/12  
C08L 23/16  
C08L 57/02  
// C08J 5/18

(21)Application number : 11-097806

(71)Applicant : SEKISUI CHEM CO LTD

(22)Date of filing : 05.04.1999

(72)Inventor : HASHIMOTO YOSEI

## (54) FILM FOR STRETCH PACKAGING

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a film for stretch packaging made of a material friendly to the environment.

SOLUTION: A resin composition for a center layer comprises a mixture of 50 pts.wt. polypropylene resin which has 282,000 weight average molecular weight and 49.0 wt.% elution amount for a total amount of polypropylene resin at 0° C or less, 40.1 wt.% at 0° C or higher and 90° C or lower, 15 wt.% or less at an optional 5° C temperature range in the described temperature region and 10.9 wt.% at 90° C or higher and 130° C or lower, 20 pts.wt. homopolypropylene resin, 30 pts.wt. hydrogenated terpene resin and 2 pts.wt. anti fog agent. A resin composition for inner/outer layers comprises a mixture of 100 pts.wt. straight-chain low density polyethylene and 2 wt.% anti fog agent. The film for stretch packaging of a three-layer structure with 15  $\mu$ m overall thickness and 1/3/1 layer thickness ratio is manufactured of the described resin compositions by a T-die process using a cooled roll.

## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the  
examiner's decision of rejection or application  
converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of  
rejection]

[Date of requesting appeal against examiner's decision  
of rejection]

[Date of extinction of right]

Copyright (C): 1998,2003 Japan Patent Office

\* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

## CLAIMS

[Claim(s)]

[Claim 1] Even if few [ consist of a main layer and both outer layers that consist of straight chain-like low density polyethylene by which the laminating was carried out to both sides of this main layer and ], it is a film with an overall thickness [ of a three-tiered structure ] of 7-18 micrometers. This main layer Weight average molecular weight is 150,000-500,000, and the elution volume to the whole quantity of the polypropylene resin measured by cross separation method is 30 - 60 % of the weight below 0 degree C. The polypropylene resin which is 15 or less % of the weight by temperature width of face of 5 degrees C of the arbitration of the 30 - 50 % of the weight and the area within this temperature in 90 degrees C or less, and is 5 - 20 % of the weight below 130 degrees C exceeding 90 degrees C exceeding 0 degree C 40 - 90 % of the weight, The film for stretch packaging characterized by consisting of a resin constituent containing 5 - 50 % of the weight of hydrogenation petroleum resin added by this polypropylene resin.

[Translation done.]

\* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

DETAILED DESCRIPTION

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the stretch packaging film which can be used suitable for the tray package which has stretch packaging fitness and was excellent in transparency.

[0002]

[Description of the Prior Art] Conventionally, the film for stretch packaging is used for packing various things, and is used especially suitable for the tray package of food, such as garden stuff and perishable foods (a fish, meat, daily dish, etc.).

[0003] Heating welding is carried out, after having usually put the packaged food-ed into the plastic envelope which consists of styrene foam etc., putting the film for stretch packaging on the container, pulling the edge of this film, wrapping in a container for the film itself with the stretch and carrying out temporary immobilization of the film in piles with the tray rear face using the self-adhesiveness, in order to have carried out the tray package of the food etc. using the film for stretch packaging. In order to raise the commodity value of a packaged food-ed, a tight and beautiful package appearance is searched for, and in addition to transparency, flexibility, and an extensibility, the film for stretch packaging is required to excel in self-adhesiveness and deformation recoverability (stability).

[0004] Conventionally, as a film for stretch packaging used for a package, what uses a plasticization polyvinyl chloride (henceforth "Plasticization PVC") as a principal component from the field of a price or the ease of handling was used widely. However, environmental pollution is regarded as questionable and to avoid the activity of the plasticization PVC which is the matter containing chlorine in all fields is desired in recent years.

[0005] For this reason, recently, it is in the inclination for the film for stretch packaging which used polyolefine system resin to be positively used as alternate material of Plasticization PVC. As such a film for stretch packaging, what consists of straight chain-like low density polyethylene, an ethylene-vinylacetate copolymer (henceforth EVA), polypropylene, polybutadiene, etc. is mentioned, for example.

[0006] However, with the film for stretch packaging using the polyolefine system resin like the above, a property required as films for stretch packaging at the time of a package, such as self-adhesiveness and deformation recoverability, is not fully acquired. For this reason, the film which packed the container may separate from a container immediately, or Siwa may be generated on a film and a package appearance may be spoiled.

[0007] JP,61-44635,A in order to solve this problem -- a publication -- like The film for stretch packaging with which it comes to carry out the laminating of the layer which uses EVA as a principal component to both sides of the layer which uses the random copolymer of a propylene and various alpha olefins as a principal component is proposed, and the film for stretch packaging with which it comes to carry out the laminating of the layer which uses EVA as a principal component to both sides of the layer which uses the block copolymer of aromatic hydrocarbon polymers, such as styrene, and a conjugated diene elastomer as a principal component like a publication at JP,62-51440,A is proposed.

[0008] However, with the film using these copolymers, since restoration took place rapidly, some which what has the low recovery after stretch packaging generated Siwa after the package, and raised the recovery had the problem that a container deformed, and they had the difficulty which can use neither suitably as a film for stretch packaging.

[0009] Moreover, although the film for stretch packaging which fabricated these polyolefine system resin by the tubular film process of a high blow ratio was proposed in order to solve an above-mentioned problem, there was a problem that mass production nature could not be raised from the reasons of the shaping process which cannot quench.

[0010] Then, although this invention persons proposed the approach of improving mass production nature with shaping by the T-die method previously, it became insufficient [ the film fabricated since a T-die method was the fabricating method which is easy to carry out orientation in the die-length direction (henceforth MD) / longitudinal direction (henceforth TD) orientation ], and the problem of being easy to generate Siwa in connection with TD hauling remained. Furthermore, shaping by the T-die method has a limitation in the distributed approach of thickness distribution like a tubular film process, and it also has the problem in which the heavy-gage part or light-gage part of a film is always accumulated. Consequently, the obtained film will become the unsightly thing of the volume [ which \*\*\*\*\*ed) in the thick part ] appearance which wound, became an appearance or involved Ayr in the film light-gage part. Moreover, a blemish is generated on a film by the collision with the exterior, or a light-gage part causes the albinism by the local bleed out of the antifogger by the Ayr contamination, and a heavy-gage part has the problem of generating an appearance defect. Furthermore, since it is difficult for the film fabricated by the T-die method to carry out TD orientation, in the operation which pulls a film to TD, a film surrenders and it is easy to produce Siwa. Moreover, when other special elastomers are used, even if the engine performance improves, cost costs dearly and is not practical.

[0011] Therefore, the film for stretch packaging which fully satisfies a demand of a commercial scene with the actual condition as a substitute of the film for stretch packaging which uses plasticization PVC as a principal component is not realized.

[0012]

[Problem(s) to be Solved by the Invention] This invention solves the problem of the conventional technique like the above, and aims at offering the film for stretch packaging from an environment-friendly ingredient. It becomes a technical problem to obtain the engine performance for which the plasticization PVC used from the former for that purpose can be substituted with polyolefine system resin. That is, it is called for that it is what the film made of polyolefine system resin abolishes generating of Siwa at the time of TD hauling generated as well as excelling in flexibility, an extensibility, self-adhesiveness, and stability when T-die shaping is carried out, and does not spoil cut nature.

[0013]

[Means for Solving the Problem] The laminating of the film for stretch packaging by this invention was carried out to both sides of a main layer and this main layer. Even if few [ consist of both outer layers that consist of straight chain-like low density polyethylene and ], it is a film with an overall thickness [ of a three-tiered structure ] of 7-18 micrometers. This main layer Weight average molecular weight is 150,000-500,000, and the elution volume to the whole quantity of the polypropylene resin measured by cross separation method is 30 - 60 % of the weight below 0 degree C. The polypropylene resin which is 15 or less % of the weight by temperature width of face of 5 degrees C of the arbitration of the 30 - 50 % of the weight and the area within this temperature in 90 degrees C or less, and is 5 - 20 % of the weight below 130 degrees C exceeding 90 degrees C exceeding 0 degree C 40 - 90 % of the weight, It is characterized by consisting of a resin constituent containing 5 - 50 % of the weight of hydrogenation petroleum resin added by this polypropylene resin.

[0014] if the extensibility of the film for stretch packaging obtained as the weight average molecular weight of the above-mentioned polypropylene resin is less than 150,000 is not enough and exceeds 500,000 conversely, it will come out that the flexibility of the film for stretch packaging obtained becomes inadequate.

[0015] Moreover, the elution volume to the whole quantity of the polypropylene resin measured by cross separation method is 30 – 60 % of the weight below 0 degree C, and the above-mentioned polypropylene resin is 33 – 55 % of the weight preferably. When there is no flexibility in the film for stretch packaging which will be obtained if this elution volume is less than 30 % of the weight and it exceeds 60 % of the weight conversely, the elasticity of the film for stretch packaging obtained is not sometimes enough.

[0016] Moreover, exceeding 0 degree C, below 90 degrees C, it is 35 – 50 % of the weight preferably, and the elution volume to the whole quantity of the polypropylene resin which measured the above-mentioned polypropylene resin by cross separation method is 15 or less % of the weight 30 to 55% of the weight by temperature width of face of 5 degrees C of the arbitration of the area within this temperature. When there is no flexibility in the film for stretch packaging obtained and it exceeds 55 % of the weight conversely, and when this elution volume is less than 30 % of the weight, and exceeding 15 % of the weight by temperature width of face of 5 degrees C of arbitration, the deformation recoverability of the film for stretch packaging obtained may be inferior.

[0017] Furthermore, the elution volume to the whole quantity of the polypropylene resin which measured the polypropylene resin by cross separation method is 7 – 18 % of the weight preferably five to 20% of the weight below 130 degrees C exceeding 90 degrees C. When the elasticity of the film for stretch packaging which will be obtained if this elution volume is less than 5 % of the weight is not enough and exceeds 20 % of the weight conversely, the deformation recoverability of the film for stretch packaging obtained may be inferior.

[0018] The resin which carried out the detailed decentralization of the polypropylene resin which contains the elastomer component which consists of ethylene propylene rubber 30% of the weight or more as an example of the polypropylene resin which has such a property as a matrix is mentioned. As such a propylene system copolymer, the propylene system copolymer obtained by the reactor blending method is desirable. The reactor blending method is the polymerization method for the ability to be able to manufacture the polymer of two or more classes continuously by performing the polymerization of two or more steps of multistage stories rather than completing a polymerization at once here, and the so-called usual polymer blend method for obtaining the mixed resin which consists of a polymer of a different class using mechanical technique is different technique, and is an approach of producing the blend type copolymerization resin in a molecular level.

[0019] The resin obtained by the reactor blending method can obtain the thing which each resin possesses and which embodied faithfully the machinability from which a property differs, when each component distributes minutely. As the concrete manufacture approach, the approach indicated by JP,3-205439,A is mentioned, for example.

[0020] A general polypropylene resin may be added by the reactor blending method copolymerization polypropylene resin. Here, the polypropylene resins added may be the random copolymer of gay polypropylene, a propylene, and an alpha olefin, and the block copolymer of a propylene and an alpha olefin, and choosing suitably according to an application is desirable. The film which consists of the reactor blending method copolymerization polypropylene resin shows the physical properties excellent in flexibility or spread nature compared with the film which consists of a polypropylene simple substance or a polyethylene simple substance, and is excellent in stretch packaging fitness.

[0021] Since the film which consisted of these polypropylene resins is excellent also in the spread nature at the time of melting, it fits the shaping approach of requiring high-speed membrane formation nature like a T-die method. However, when the film of this polypropylene resin simple substance is fabricated by the T-die method, in case it is too flexible and applies to a machine package, there is a problem that cut nature is bad. Then, although solution of the above-mentioned problem was aimed at by mixing of two or more sorts of resin, the film fabricated since a T-die method was the fabricating method which is easy to carry out MD orientation becomes insufficient [ TD orientation ], and has the problem of being easy to generate Siwa in connection with TD hauling.

[0022] In order to solve this problem, this invention stimulates elastic-modulus lowering in a



quality item and, as for the Hayes value, it is desirable that it is 2.0% or less. Therefore, the T-die method in which quenching shaping is possible is suitable for obtaining the film excellent in transparency. In addition, the film cooled by making the surface state of a cooling roller smooth in this roll surface has the outstanding gloss. Furthermore, since a T-die method has high cooling effectiveness and high velocity forming is made possible, it has the advantage that mass production nature can be improved compared with a tubular film process. Since the film fabricated by the tubular film process tends to turn into a film with the high Hayes value for annealing shaping, it uses what has a low consistency for the straight chain-like low density polyethylene for both outer layers. T-die method shaping can make the selection range of resin large, and is advantageous at this point.

[0034] Since it is what mainly makes food packing an application, refrigeration storage of the film for stretch packaging is carried out in many cases. Since the moisture of contents dewes the refrigerated film front face, it is desirable to add an antifogger on a film as the cure. Although at least not both outer layers care about addition of an antifogger, adding also in a main layer is desirable. By adding an antifogger to all layers, the bleed out of the antifogger on the front face of a film can be promoted. About 1 – 5% of the weight of all the film weight of the addition of an antifogger is desirable. Disagreeable \*\*\*\*\* which the amount of bleeding of an antifogger will become superfluous and will produce film milkiness if the fog resistance ability at the time of low temperature is not enough demonstrated as the addition of an antifogger is less than 1 % of the weight, but it exceeds 5 % of the weight. As an example of an antifogger, higher-fatty-acid ester and polyhydric alcohol are mentioned.

[0035]

[Embodiment of the Invention] Below, an example explains this invention concretely.

[0036] Weight average molecular weight as a resin constituent for <example 1> core layers 282,000, The elution volume to the whole quantity of the polypropylene resin measured by cross separation method is 49.0 % of the weight below 0 degree C. The polypropylene resin 50 weight section which is 15 or less % of the weight exceeding 0 degree C by temperature width of face of 5 degrees C of the arbitration of the 40.1 % of the weight and the area within this temperature in 90 degrees C or less, and is 10.9 % of the weight below 130 degrees C exceeding 90 degrees C, What carried out 2 weight sections addition of the antifogger was used for what mixed the gay polypropylene resin (consistency 0.90 g/cm<sup>3</sup>, MFR2.2) 20 weight section and the hydrogenation petroleum resin (hydrogenation terpene resin) 30 weight section. On the other hand, what added 2 % of the weight of antifoggers was used for the straight chain-like low-density-polyethylene (consistency 0.917g/cm<sup>3</sup>, MFR2.0) 100 weight section as a resin constituent for inside-and-outside layers. From these resin constituents, the roll was cooled by the T-die method and the film for stretch packaging which consists of a complex film of the three-tiered structure whose overall thickness is 15 micrometers, and whose thickness ratio is outer layer / middle lamella / inner layer = 1/3/1 was manufactured.

[0037] Except having fabricated the <example 2> film by the tubular film process, the same actuation as an example 1 was performed, and the film for stretch packaging was manufactured.

[0038] Except having obtained the monolayer film which consisted of only <example 1 of comparison> core layers, the same actuation as an example 1 was performed, and the film for stretch packaging was manufactured.

[0039] Using what consists of 50 % of the weight of polypropylene regins used for the example 1, and 50 % of the weight (consistency 0.90g/cm<sup>3</sup>, MFR2.2) of gay propylene resin as a resin constituent for the <example 2 of comparison> core layers, except having not added, hydrogenation petroleum resin performed the same actuation as an example 1, and manufactured the film for stretch packaging.

[0040] As a resin constituent for the <example 3 of comparison> core layers, using what consists of 50 % of the weight (hydrogenation terpene resin) of hydrogenation petroleum resin, and 50 % of the weight (consistency 0.90 g/cm<sup>3</sup>, MFR2.2) of gay propylene resin, the same actuation as an example 1 was performed, and the film for stretch packaging was manufactured except having not used the polypropylene resin used in the example 1.

[0041] As a resin constituent for the <example 4 of comparison> core layers, except having used

only gay polypropylene (consistency 0.90 g/cm<sup>3</sup>, MFR2.2), the same actuation as an example 1 was performed, and the film for stretch packaging was manufactured.

[0042] The performance evaluation test was performed about the following item to the film obtained in the performance-evaluation example and the example of a comparison. The obtained test result is collectively shown in a table 1.

[0043] - Yield point existence : the film pierced by the No. 4 dumbbell was pulled at the rate of 100 mm/min to TD using the hauling testing machine. The existence of the yield point was judged from the S-S curve on the chart form drawn by rate 1000 mm/min. When the existence of the yield point was indefinite, and stress was more than stress at the time of 100% extension at the time of 10% extension, it considered as those with the yield point.

[0044] - Hand lap nature : the size 190mmx110mmx25mm plastic tray was packed so that TD might serve as a tray longitudinal direction with a hand lap packaging machine. The \*\*\*\* ductility which begins to generate Siwa of Film TD at the time of the actuation which holds a film edge by hand and TD is made to elongate was checked.

[0045] - Gross : it measured according to the approach of JIS-K7105 publication.

[0046] - Hayes : it measured according to the approach of JIS-K7105 publication.

[0047] - Volume appearance : the film which rolled round the film in the 1000m volume on the 3 inch paper tube periphery was left for one week at 40 degrees C. The existence of air bubbles was visually checked after one week.

[0048] The valuation basis is as follows.

[0049]

O : with [ in the area exceeding 80% on the front face of a periphery / in 20 - 80% of area of air-bubbles-less \*\*:periphery front face / in less than 20% of area of air-bubbles-less x:periphery front face ] no air bubbles [A table 1]

#### フィルム物性測定結果

項 目	単 位	実施例 1	実施例 2	比較例 1	比較例 2	比較例 3	比較例 4
降伏点有無	—	無し	無し	無し	無し	有り	有り
ハンドラップ性	%	2 1 0	2 4 0	1 6 0	1 5 0	4 0	4 0
ヘイズ	%	1 . 1	1 . 5	5 . 3	1 . 2	1 . 2	1 . 1
グロス	—	1 2 5	1 2 0	6 5	1 2 0	1 2 5	1 2 5
巻き外観	—	○	○	×	△	△	△
総合判定	—	○	○	×	△	×	×

The film of an example showed the good result also in which item so that clearly from a table 1. [0050]

[Effect of the Invention] By this invention, the film for stretch packaging can be obtained using the polyolefine system resin which is an environment-friendly ingredient as a resin ingredient for which the plasticization PVC used from the former can be substituted. what this film for stretch packaging excels [ what ] in flexibility and an extensibility, and does not generate Siwa at the time of TD tension by the hand lap -- it is -- a volume appearance and a feeling of film transparence -- excelling .



[Translation done.]

\* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

TECHNICAL FIELD

---

[Field of the Invention] This invention relates to the stretch packaging film which can be used suitable for the tray package which has stretch packaging fitness and was excellent in transparency.

---

[Translation done.]

\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] Conventionally, the film for stretch packaging is used for packing various things, and is used especially suitable for the tray package of food, such as garden stuff and perishable foods (a fish, meat, daily dish, etc.).

[0003] Heating welding is carried out, after having usually put the packaged food-ed into the plastic envelope which consists of styrene foam etc., putting the film for stretch packaging on the container, pulling the edge of this film, wrapping in a container for the film itself with the stretch and carrying out temporary immobilization of the film in piles with the tray rear face using the self-adhesiveness, in order to have carried out the tray package of the food etc. using the film for stretch packaging. In order to raise the commodity value of a packaged food-ed, a tight and beautiful package appearance is searched for, and in addition to transparency, flexibility, and an extensibility, the film for stretch packaging is required to excel in self-adhesiveness and deformation recoverability (stability).

[0004] Conventionally, as a film for stretch packaging used for a package, what uses a plasticization polyvinyl chloride (henceforth "Plasticization PVC") as a principal component from the field of a price or the ease of handling was used widely. However, environmental pollution is regarded as questionable and to avoid the activity of the plasticization PVC which is the matter containing chlorine in all fields is desired in recent years.

[0005] For this reason, recently, it is in the inclination for the film for stretch packaging which used polyolefine system resin to be positively used as alternate material of Plasticization PVC. As such a film for stretch packaging, what consists of straight chain-like low density polyethylene, an ethylene-vinylacetate copolymer (henceforth EVA), polypropylene, polybutadiene, etc. is mentioned, for example.

[0006] However, with the film for stretch packaging using the polyolefine system resin like the above, a property required as films for stretch packaging at the time of a package, such as self-adhesiveness and deformation recoverability, is not fully acquired. For this reason, the film which packed the container may separate from a container immediately, or Siwa may be generated on a film and a package appearance may be spoiled.

[0007] JP,61-44635,A in order to solve this problem -- a publication -- like The film for stretch packaging with which it comes to carry out the laminating of the layer which uses EVA as a principal component to both sides of the layer which uses the random copolymer of a propylene and various alpha olefins as a principal component is proposed, and the film for stretch packaging with which it comes to carry out the laminating of the layer which uses EVA as a principal component to both sides of the layer which uses the block copolymer of aromatic hydrocarbon polymers, such as styrene, and a conjugated diene elastomer as a principal component like a publication at JP,62-51440,A is proposed.

[0008] However, with the film using these copolymers, since restoration took place rapidly, some which what has the low recovery after stretch packaging generated Siwa after the package, and raised the recovery had the problem that a container deformed, and they had the difficulty which can use neither suitably as a film for stretch packaging.

[0009] Moreover, although the film for stretch packaging which fabricated these polyolefine system resin by the tubular film process of a high blow ratio was proposed in order to solve an

above-mentioned problem, there was a problem that mass production nature could not be raised from the reasons of the shaping process which cannot quench.

[0010] Then, although this invention persons proposed the approach of improving mass production nature with shaping by the T-die method previously, it became insufficient [ the film fabricated since a T-die method was the fabricating method which is easy to carry out orientation in the die-length direction (henceforth MD) / longitudinal direction (henceforth TD) orientation ], and the problem of being easy to generate Siwa in connection with TD hauling remained. Furthermore, shaping by the T-die method has a limitation in the distributed approach of thickness distribution like a tubular film process, and it also has the problem in which the heavy-gage part or light-gage part of a film is always accumulated. Consequently, the obtained film will become the unsightly thing of the volume [ which \*\*\*\*\*ed) in the thick part ] appearance which wound, became an appearance or involved Ayr in the film light-gage part. Moreover, a blemish is generated on a film by the collision with the exterior, or a light-gage part causes the albinism by the local bleed out of the antifogger by the Ayr contamination, and a heavy-gage part has the problem of generating an appearance defect. Furthermore, since it is difficult for the film fabricated by the T-die method to carry out TD orientation, in the operation which pulls a film to TD, a film surrenders and it is easy to produce Siwa. Moreover, when other special elastomers are used, even if the engine performance improves, cost costs dearly and is not practical.

[0011] Therefore, the film for stretch packaging which fully satisfies a demand of a commercial scene with the actual condition as a substitute of the film for stretch packaging which uses plasticization PVC as a principal component is not realized.

[Translation done.]

\* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

EFFECT OF THE INVENTION

---

[Effect of the Invention] By this invention, the film for stretch packaging can be obtained using the polyolefine system resin which is an environment-friendly ingredient as a resin ingredient for which the plasticization PVC used from the former can be substituted. what this film for stretch packaging excels [ what ] in flexibility and an extensibility, and does not generate Siwa at the time of TD tension by the hand lap -- it is -- a volume appearance and a feeling of film transparence -- excelling .

---

[Translation done.]

\* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

TECHNICAL PROBLEM

---

[Problem(s) to be Solved by the Invention] This invention solves the problem of the conventional technique like the above, and aims at offering the film for stretch packaging from an environment-friendly ingredient. It becomes a technical problem to obtain the engine performance for which the plasticization PVC used from the former for that purpose can be substituted with polyolefine system resin. That is, it is called for that it is what the film made of polyolefine system resin abolishes generating of Siwa at the time of TD hauling generated as well as excelling in flexibility, an extensibility, self-adhesiveness, and stability when T-die shaping is carried out, and does not spoil cut nature.

---

[Translation done.]

\* NOTICES \*

JPO and NCIPJ are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

MEANS

---

[Means for Solving the Problem] The laminating of the film for stretch packaging by this invention was carried out to both sides of a main layer and this main layer. Even if few [ consist of both outer layers that consist of straight chain-like low density polyethylene and ], it is a film with an overall thickness [ of a three-tiered structure ] of 7-18 micrometers. This main layer Weight average molecular weight is 150,000-500,000, and the elution volume to the whole quantity of the polypropylene resin measured by cross separation method is 30 - 60 % of the weight below 0 degree C. The polypropylene resin which is 15 or less % of the weight by temperature width of face of 5 degrees C of the arbitration of the 30 - 50 % of the weight and the area within this temperature in 90 degrees C or less, and is 5 - 20 % of the weight below 130 degrees C exceeding 90 degrees C exceeding 0 degree C 40 - 90 % of the weight, It is characterized by consisting of a resin constituent containing 5 - 50 % of the weight of hydrogenation petroleum resin added by this polypropylene resin.

[0014] if the extensibility of the film for stretch packaging obtained as the weight average molecular weight of the above-mentioned polypropylene resin is less than 150,000 is not enough and exceeds 500,000 conversely, it will come out that the flexibility of the film for stretch packaging obtained becomes inadequate.

[0015] Moreover, the elution volume to the whole quantity of the polypropylene resin measured by cross separation method is 30 - 60 % of the weight below 0 degree C, and the above-mentioned polypropylene resin is 33 - 55 % of the weight preferably. When there is no flexibility in the film for stretch packaging which will be obtained if this elution volume is less than 30 % of the weight and it exceeds 60 % of the weight conversely, the elasticity of the film for stretch packaging obtained is not sometimes enough.

[0016] Moreover, exceeding 0 degree C, below 90 degrees C, it is 35 - 50 % of the weight preferably, and the elution volume to the whole quantity of the polypropylene resin which measured the above-mentioned polypropylene resin by cross separation method is 15 or less % of the weight 30 to 55% of the weight by temperature width of face of 5 degrees C of the arbitration of the area within this temperature. When there is no flexibility in the film for stretch packaging obtained and it exceeds 55 % of the weight conversely, and when this elution volume is less than 30 % of the weight, and exceeding 15 % of the weight by temperature width of face of 5 degrees C of arbitration, the deformation recoverability of the film for stretch packaging obtained may be inferior.

[0017] Furthermore, the elution volume to the whole quantity of the polypropylene resin which measured the polypropylene resin by cross separation method is 7 - 18 % of the weight preferably five to 20% of the weight below 130 degrees C exceeding 90 degrees C. When the elasticity of the film for stretch packaging which will be obtained if this elution volume is less than 5 % of the weight is not enough and exceeds 20 % of the weight conversely, the deformation recoverability of the film for stretch packaging obtained may be inferior.

[0018] The resin which carried out the detailed decentralization of the polypropylene resin which contains the elastomer component which consists of ethylene propylene rubber 30% of the weight or more as an example of the polypropylene resin which has such a property as a matrix is mentioned. As such a propylene system copolymer, the propylene system copolymer obtained

by the reactor blending method is desirable. The reactor blending method is the polymerization method for the ability to be able to manufacture the polymer of two or more classes continuously by performing the polymerization of two or more steps of multistage stories rather than completing a polymerization at once here, and the so-called usual polymer blend method for obtaining the mixed resin which consists of a polymer of a different class using mechanical technique is different technique, and is an approach of producing the blend type copolymerization resin in a molecular level.

[0019] The resin obtained by the reactor blending method can obtain the thing which each resin possesses and which embodied faithfully the machinability from which a property differs, when each component distributes minutely. As the concrete manufacture approach, the approach indicated by JP,3-205439,A is mentioned, for example.

[0020] A general polypropylene resin may be added by the reactor blending method copolymerization polypropylene resin. Here, the polypropylene resins added may be the random copolymer of *g*-polypropylene, *i*-propylene, and an  $\alpha$ -olefin, and the block copolymer of a propylene and an  $\alpha$ -olefin, and choosing suitably according to an application is desirable. The film which consists of the reactor blending method copolymerization polypropylene resin shows the physical properties excellent in flexibility or spread nature compared with the film which consists of a polypropylene simple substance or a polyethylene simple substance, and is excellent in stretch packaging fitness.

[0021] Since the film which consisted of these polypropylene regins is excellent also in the spread nature at the time of melting, it fits the shaping approach of requiring high-speed membrane formation nature like a T-die method. However, when the film of this polypropylene regin simple substance is fabricated by the T-die method, in case it is too flexible and applies to a machine package, there is a problem that cut nature is bad. Then, although solution of the above-mentioned problem was aimed at by mixing of two or more sorts of resin, the film fabricated since a T-die method was the fabricating method which is easy to carry out MD orientation becomes insufficient [ TD orientation ], and has the problem of being easy to generate Siwa in connection with TD hauling.

[0022] In order to solve this problem, this invention stimulates elastic-modulus lowering in a room temperature field positively by adding hydrogenation petroleum resin to the above-mentioned polypropylene resin, and offers the film which lost the yield point to TD hauling by this. Even if the film without such the yield point gives distortion so that this may be pulled, it does not generate Siwa in order to be equal to deforming plastically. Hydrogenation terpene resin is mentioned as an example of representation of hydrogenation petroleum resin. The addition of hydrogenation petroleum resin is 5 – 50 % of the weight among the resin constituent which constitutes a main layer. If the prevention effectiveness of the above Siwa generating is not enough in the addition of hydrogenation petroleum resin being less than 5 % of the weight and it exceeds 50 % of the weight conversely, the tensile strength of a film will fall.

[0023] Moreover, when the resin constituent which added hydrogenation petroleum resin to the above-mentioned polypropylene resin is fabricated by the tubular film process on a film, there is also an advantage which TD orientation becomes remarkable and becomes the thing excellent in the easy cleavability in TD.

[0024] The rate of the polypropylene resin in the resin constituent which constitutes a main layer is 40 – 90 % of the weight. The flexibility of a film and an extensibility run short that the rate of a polypropylene resin is less than 40 % of the weight. On the contrary, if it exceeds 90 % of the weight, the prevention effectiveness of the above Siwa generating may not be enough.

[0025] Although the high thing of the rate of the resin which contains an elastomer component so much like the above-mentioned polypropylene resin is desirable in the possible range, when this rate is too high, there is a possibility that the film itself may lose the waist and it may spoil cut nature. Since such a flexible film suits the application omitted with a heating cutting edge like a hand lap packaging machine, it is desirable to select an application.

[0026] When using it with a pressure-from-below type automatic packer like an automatic package of the film for stretch packaging, in order to give the waist to a film, it is desirable to add gay polypropylene resin to the resin constituent for main layers.



[0027] Moreover, when hydrogenation petroleum resin adds this to the above-mentioned polypropylene resin, elastic-modulus lowering in a room temperature field is urged positively, consequently flexibility is high and becomes possible [ obtaining the film which has apparent self-adhesion ]. This film combines flexibility and self-adhesiveness and it enables the film itself to prevent mixing of air bubbles in the case of rolling up after shaping. The film product appearance rolled round eventually can obtain the film which became what suppressed cellular mixing to the minimum, and was excellent in the volume appearance.

[0028] Resin with which the clear yield point is not accepted as resin for main layers in the stress-strain curve (S-S curve) property in ordinary temperature is selected. When the resin which has the clear yield point is selected, the obtained film has a possibility of spoiling stability. Since heat-resistant temperature is high by choosing the above polypropylene resins, this resin also has the advantage which becomes usable in the application which requires thermal resistance like an activity with a microwave oven, or a tempura package.

[0029] Since there is a possibility of spoiling the visibility of contents when it has the property which produces surface irregularity, and it becomes what is inferior to a feeling of transparency with a monolayer film and is used for food packing etc. like this polyolefine system resin, although the resin which made an elastomer component and polypropylene the matrix can be minutely distributed by each component, the laminating of both the outer layers that become both sides of this main layer from straight chain-like low density polyethylene is carried out. Straight chain-like low density polyethylene is consistency 0.920 g/cm<sup>3</sup>. The following are desirable.

[0030] At least, in a three-tiered structure, nothing and overall thickness are the films of the above-mentioned main layer and both outer layers which are 7-18 micrometers, and the film for stretch packaging by this invention is excellent in the transparency beyond clarity 65%.

[0031] Hydrogenation petroleum resin may be blended also with both outer layers.

[0032] As for a thickness ratio, in the case of the three-tiered structure fabricated by the co-extrusion method, it is desirable that it is the range of outer layer / middle lamella / inner layer = 1/1/1-1/8/1.

[0033] the film for stretch packaging -- transparency and gloss -- \*\* -- it is an important quality item and, as for the Hayes value, it is desirable that it is 2.0% or less. Therefore, the T-die method in which quenching shaping is possible is suitable for obtaining the film excellent in transparency. In addition, the film cooled by making the surface state of a cooling roller smooth in this roll surface has the outstanding gloss. Furthermore, since a T-die method has high cooling effectiveness and high velocity forming is made possible, it has the advantage that mass production nature can be improved compared with a tubular film process. Since the film fabricated by the tubular film process tends to turn into a film with the high Hayes value for annealing shaping, it uses what has a low consistency for the straight chain-like low density polyethylene for both outer layers. T-die method shaping can make the selection range of resin large, and is advantageous at this point.

[0034] Since it is what mainly makes food packing an application, refrigeration storage of the film for stretch packaging is carried out in many cases. Since the moisture of contents dews the refrigerated film front face, it is desirable to add an antifogger on a film as the cure. Although at least not both outer layers care about addition of an antifogger, adding also in a main layer is desirable. By adding an antifogger to all layers, the bleed out of the antifogger on the front face of a film can be promoted. About 1 - 5% of the weight of all the film weight of the addition of an antifogger is desirable. Disagreeable \*\*\*\*\* which the amount of bleeding of an antifogger will become superfluous and will produce film milkiness if the fog resistance ability at the time of low temperature is not enough demonstrated as the addition of an antifogger is less than 1 % of the weight, but it exceeds 5 % of the weight. As an example of an antifogger, higher-fatty-acid ester and polyhydric alcohol are mentioned.

[0035]

[Embodiment of the Invention] Below, an example explains this invention concretely.

[0036] Weight average molecular weight as a resin constituent for <example 1> core layers 282,000, The elution volume to the whole quantity of the polypropylene resin measured by cross

separation method is 49.0 % of the weight below 0 degree C. The polypropylene resin 50 weight section which is 15 or less % of the weight exceeding 0 degree C by temperature width of face of 5 degrees C of the arbitration of the 40.1 % of the weight and the area within this temperature in 90 degrees C or less, and is 10.9 % of the weight below 130 degrees C exceeding 90 degrees C. What carried out 2 weight sections addition of the antifogger was used for what mixed the gay polypropylene resin (consistency 0.90 g/cm<sup>3</sup>, MFR2.2) 20 weight section and the hydrogenation petroleum resin (hydrogenation terpene resin) 30 weight section. On the other hand, what added 2 % of the weight of antifoggers was used for the straight chain-like low-density-polyethylene (consistency 0.917g/cm<sup>3</sup>, MFR2.0) 100 weight section as a resin constituent for inside-and-outside layers. From these resin constituents, the roll was cooled by the T-die method and the film for stretch packaging which consists of a complex film of the three-tiered structure whose overall thickness is 15 micrometers, and whose thickness ratio is outer layer / middle lamella / inner layer = 1/3/1 was manufactured.

[0037] Except having fabricated the <example 2> film by the tubular film process, the same actuation as an example 1 was performed, and the film for stretch packaging was manufactured.

[0038] Except having obtained the monolayer film which consisted of only <example 1 of comparison> core layers, the same actuation as an example 1 was performed, and the film for stretch packaging was manufactured.

[0039] Using what consists of 50 % of the weight of polypropylene resins used for the example 1, and 50 % of the weight (consistency 0.90g/cm<sup>3</sup>, MFR2.2) of gay propylene resin as a resin constituent for the <example 2 of comparison> core layers, except having not added, hydrogenation petroleum resin performed the same actuation as an example 1, and manufactured the film for stretch packaging.

[0040] As a resin constituent for the <example 3 of comparison> core layers, using what consists of 50 % of the weight (hydrogenation terpene resin) of hydrogenation petroleum resin, and 50 % of the weight (consistency 0.90 g/cm<sup>3</sup>, MFR2.2) of gay propylene resin, the same actuation as an example 1 was performed, and the film for stretch packaging was manufactured except having not used the polypropylene resin used in the example 1.

[0041] As a resin constituent for the <example 4 of comparison> core layers, except having used only gay polypropylene (consistency 0.90 g/cm<sup>3</sup>, MFR2.2), the same actuation as an example 1 was performed, and the film for stretch packaging was manufactured.

[0042] The performance evaluation test was performed about the following item to the film obtained in the performance-evaluation example and the example of a comparison. The obtained test result is collectively shown in a table 1.

[0043] - Yield point existence : the film pierced by the No. 4 dumbbell was pulled at the rate of 100 mm/min to TD using the hauling testing machine. The existence of the yield point was judged from the S-S curve on the chart form drawn by rate 1000 mm/min. When the existence of the yield point was indefinite, and stress was more than stress at the time of 100% extension at the time of 10% extension, it considered as those with the yield point.

[0044] - Hand lap nature : the size 190mmx110mmx25mm plastic tray was packed so that TD might serve as a tray longitudinal direction with a hand lap packaging machine. The \*\*\*\* ductility which begins to generate Siwa of Film TD at the time of the actuation which holds a film edge by hand and TD is made to elongate was checked.

[0045] - Gross : it measured according to the approach of JIS-K7105 publication.

[0046] - Hayes : it measured according to the approach of JIS-K7105 publication.

[0047] - Volume appearance : the film which rolled round the film in the 1000m volume on the 3 inch paper tube periphery was left for one week at 40 degrees C. The existence of air bubbles was visually checked after one week.

[0048] The valuation basis is as follows.

[0049]

O : with [ in the area exceeding 80% on the front face of a periphery / in 20 - 80% of area of air-bubbles-less \*\*:periphery front face / in less than 20% of area of air-bubbles-less x:periphery front face ] no air bubbles [A table 1]

## フィルム物性測定結果

項 目	単 位	実施例 1	実施例 2	比較例 1	比較例 2	比較例 3	比較例 4
降伏点有無	—	無し	無し	無し	無し	有り	有り
ハンドラップ性	%	2 1 0	2 4 0	1 6 0	1 5 0	4 0	4 0
ヘイズ	%	1 . 1	1 . 5	5 . 3	1 . 2	1 . 2	1 . 1
グロス	—	1 2 5	1 2 0	6 5	1 2 0	1 2 5	1 2 5
巻き外観	—	○	○	×	△	△	△
総合判定	—	○	○	×	△	×	×

The film of an example showed the good result also in which item so that clearly from a table 1.

[Translation done.]

**This Page Blank (uspto)**